

AIR MINISTRY.

DIRECTORATE OF CIVIL AVIATION.

Annual Report

on the

Progress of Civil Aviation.

(April 1st, 1923—March 31st, 1924.)

*Presented to Parliament by Command
of His Majesty.*

L O N D O N :

PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE.

To be purchased directly from H.M. STATIONERY OFFICE at the following addresses :
Imperial House, Kingsway, London, W.C. 2; 28, Abingdon Street, London, S.W. 1;
York Street, Manchester; 1, St. Andrew's Crescent, Cardiff;
or 120, George Street, Edinburgh;
or through any Bookseller.

1924.

Price 1s. Net.

Cmd. 2210.

SUMMARY OF CONTENTS.

	PAGE.
INTRODUCTION - - - - -	3
 PART I.—GENERAL AND BRITISH EMPIRE :	
Relations with Foreign Countries - - - - -	4
Air Mails Committee - - - - -	5
Imperial Airways, Limited - - - - -	6
Commercial Air Services - - - - -	6
Estimates - - - - -	10
Air Navigation Regulations - - - - -	10
Licences and Certificates - - - - -	11
Airships - - - - -	11
Training of Reserve Officers - - - - -	12
Exhibitions, Competitions, &c. - - - - -	13
Ground Organisation :	
Navigation - - - - -	15
Wireless Communications - - - - -	16
Meteorology - - - - -	18
Aeronautical Maps - - - - -	19
Technical Services - - - - -	20
Medical Services - - - - -	22
Investigation of accidents to civil aircraft - - - - -	23
Statistics of Civil flying.—Summary - - - - -	26
 TABLES :	
A. British Civil Aviation - - - - -	28
B. Aircraft Flights and Passengers carried between Great Britain and the Continent - - - - -	29
C. Value of goods imported and exported by Aircraft - - - - -	30
D. Efficiency of British Air Transport Services - - - - -	31
E. Causes of landings <i>en route</i> for other than traffic requirements - - - - -	32
F. Accidents : Civil Aviation - - - - -	33
The Dominions, India and the Colonies - - - - -	34
 PART II.—FOREIGN COUNTRIES :	
General Remarks - - - - -	38
Europe :	
Austria - - - - -	39
Belgium - - - - -	39
Czechoslovakia - - - - -	40
Denmark - - - - -	41
France - - - - -	41
Germany - - - - -	43
Holland - - - - -	45
Hungary - - - - -	46
Italy - - - - -	47
Roumania - - - - -	48
Soviet Russia - - - - -	48
Spain - - - - -	49
Sweden - - - - -	49
Switzerland - - - - -	49
America :	
Argentina - - - - -	50
Colombia - - - - -	50
U.S.A. - - - - -	51

INTRODUCTION.

The present report continues and supplements the account of the development of civil aviation contained in the previous annual or half-yearly reports listed below.

One important addition has been made to the subjects dealt with in the report, namely, the investigation of civil aviation accidents.

Under the Air Navigation (Investigation of Accidents) Regulations, 1922 (S. R. & O. 1922, No. 650), the Air Ministry have powers to investigate certain descriptions of accidents to civil aircraft. It is considered that the publication of details of the work carried out by the Inspector of Accidents in conformity with these Regulations is beneficial to the growth of an informed public opinion in regard to civil flying accidents, and such details are accordingly included (pages 23-26).

PREVIOUS REPORTS.

“Synopsis of Progress of Work in the Department of Civil Aviation, 1st May, 1919, to 31st October, 1919” (Cmd. 418, H.M. Stationery Office, 2*d.*); “Synopsis of Progress of Civil Aviation in Foreign Countries, up to 31st October, 1919” (Cmd. 476, H.M. Stationery Office, 1*d.*); “Half-Yearly Report on the Progress of Civil Aviation, 1st October, 1919, to 31st March, 1920” (Cmd. 800, H.M. Stationery Office, 3*d.*); “Half-Yearly Report on the Progress of Civil Aviation, 1st April, 1920, to 30th September, 1920” (Cmd. 1073, H.M. Stationery Office, 4*d.*); “Half-Yearly Report on the Progress of Civil Aviation, 1st October, 1920, to 31st March, 1921” (Cmd. 1342, H.M. Stationery Office, 6*d.*); “Half-Yearly Report on the Progress of Civil Aviation, 1st April, 1921, to 30th September, 1921” (Cmd. 1559, H.M. Stationery Office, 3*s.*); “Half-Yearly Report on the Progress of Civil Aviation, 1st October, 1921, to 31st March, 1922” (Cmd. 1710, H.M. Stationery Office, 6*d.*); and “Annual Report on the Progress of Civil Aviation, April 1st, 1922, to March 31st, 1923” (Cmd. 1900, H.M. Stationery Office, 9*d.* net).

To Brigadier-General the Rt. Hon. LORD THOMSON, P.C.,
C.B.E., D.S.O., Secretary of State for Air.

ANNUAL REPORT ON CIVIL AVIATION.

1st April, 1923, to 31st March, 1924.

PART I.—GENERAL.

RELATIONS WITH FOREIGN COUNTRIES.

International Commission for Air Navigation.

The permanent International Commission instituted in accordance with Article 34 of the Convention for the Regulation of Aerial Navigation (Paris, 13th October, 1919) held three sessions during the year under review, and meetings of the Technical Sub-Commissions have been held between the sessions. The fourth session was held in London from 26th to 30th June, 1923, the fifth in Rome from 26th to 31st October, 1923, and the sixth in Paris from 3rd to 6th March, 1924. The Commission decided at the fifth session that in future two, instead of three, ordinary meetings should be held each year, normally in April and October.

At the fourth session, Italy was represented for the first time, and at the sixth session Bulgaria and Czechoslovakia.

The States which are now parties to the Convention are Belgium, Bolivia, Great Britain, Canada, Australia, South Africa, New Zealand, India, Bulgaria, Czechoslovakia, France, Greece, Italy, Japan, Persia, Portugal, the Kingdom of the Serbs, Croats and Slovenes, and Siam.

The representation of Great Britain, the Dominions and India remains unchanged; as Director of Civil Aviation I have continued to act as permanent British representative on the International Commission for Air Navigation, and to represent also the interests of the Dominions and India.

The Protocol of Amendment of Article 5, adopted by the International Commission for Air Navigation at the second session, held in London in October, 1922, has now been signed or adhered to by all the contracting States with the exception of Bolivia and Persia,* and ratifications have been deposited by Belgium, the British Empire and Siam. This Protocol when ratified by all the States who are parties to the Convention will enable special agreements for international air transport to be drawn up with States which are not parties to the Convention, provided that the terms of these special agreements conform to the regulations already adopted and do not infringe the rights of the other contracting parties.

* The Protocol was signed by Persia on 7th April, 1924.

The Protocol of Amendment of Article 34, amending the system of voting on the International Commission for Air Navigation, has now been signed by all the contracting States except Bolivia, Persia* and the Kingdom of the Serbs, Croats and Slovenes.

The Commission is proceeding with the establishment of the standard minimum requirements for the issue of certificates of airworthiness, the standard minimum medical requirements for the issue of licences to pilots and other members of the crew of aircraft, a universal system of marking on the ground the names of aerodromes available for public use, aeronautical maps, the revision of the Meteorological Annex to the Convention, &c.

The I.C.A.N. has also adopted an international form of journey log-book, to be carried on board all aircraft engaged in international flying, standard forms of certificates of competency and licences for aircraft personnel, and an international form of certificate of airworthiness.

Temporary Agreements with Foreign Powers.

Great Britain and Northern Ireland have entered into Air Traffic Agreements with Denmark, Norway, Sweden, and Switzerland, and the agreement with Holland has been signed and is only awaiting ratification. The temporary agreement with Czechoslovakia expired on 31st March, 1924, but it had not been found practicable to operate any services under this agreement owing to the attitude adopted by Germany with regard to flight over her territory.

Permission has been granted by Germany on a reciprocal basis, generally for periods of three months at a time, enabling the operation of British air services to Cologne and Berlin. It has not been possible, except on the basis of a special and temporary authorisation, to arrange for flight by British aircraft to and over German territory as an Anglo-German Air Agreement is impossible until either Germany signifies her adherence to the International Air Convention or until the Protocol of Amendment to Article 5 has been ratified by all the States who are parties to the Convention.

AIR MAILS COMMITTEE.

The Air Mails Committee, appointed jointly by the Postmaster-General and the Secretary of State for Air, under the chairmanship of Lieut.-Colonel J. T. C. Moore-Brabazon, M.C., M.P., "to consider the present arrangements for air mails and the possibilities for improving and extending them and the co-ordination of the work of the General Post Office and the Air Ministry in connection therewith," presented an interim report on 19th January, 1924.†

* Persia signed this Protocol on 9th April, 1924.

† Cmd. 2038; H.M. Stationery Office, price 6d. net.

IMPERIAL AIRWAYS, LIMITED.

An agreement carrying out the recommendations made by the Civil Air Transport Subsidies Committee (the "Hambling Committee") dated 15th February, 1923 (*see* Cmd. 1811*) was made on 22nd December, 1923, with the British, Foreign and Colonial Corporation, Limited, providing for the formation of a Company (to be called the Imperial Air Transport Company, Limited, subsequently changed to Imperial Airways, Limited) to operate heavier-than-air air transport services in Europe, as from 1st April, 1924.

The agreement between the Air Council and the new Company is attached as a schedule to the agreement with the Corporation, and provides for the operation of air services for the transport of passengers, mails and freight over the routes hitherto operated by Handley Page Transport, Limited, Instone Air Line, Limited, Daimler Hire, Limited, and British Marine Air Navigation Company, Limited, or between such other places as may be approved.

The Company undertake to complete during the first four years an average minimum annual mileage of 1,000,000 miles on air services; and a minimum annual mileage in each of these years of 800,000 miles, and of 1,000,000 miles per annum afterwards until the subsidy of 1,000,000*l.*, payable to the Company by decreasing annual amounts during a period of ten years, shall have been repaid, as provided for in the agreement.

COMMERCIAL AIR SERVICES.

Subsidised Services.

The scheme for subsidised services, which was sanctioned to be put into operation on the 1st October, 1922, was carried out throughout the period 1st April, 1923, to 31st March, 1924, with slight modifications. The scheme allowed for the operation of services as follows:—

Firm.	Service.	Annual minimum services in each direction.	Annual minimum total mileage.	Annual maximum subsidy.
				£
Handley Page Transport, Ltd.	London-Paris	300	—	15,000
Instone Air Line, Ltd.	London-Brussels-Cologne.	300	—	25,000
Daimler Hire, Ltd.	Manchester-London-Amsterdam-Hamburg-Berlin.	—	253,846	55,000
British Marine Air Navigation Co., Ltd	Southampton (Cherbourg, Havre, and Channel Islands).	—	60,000	10,000

* Cmd. 1811; H.M. Stationery Office, price 6*d.* net.

All of the above services were regularly operated with the exception of those scheduled for the British Marine Air Navigation Company, Limited, which confined its service to the route Southampton-Guernsey on account of difficulties which arose with regard to using the port of Cherbourg as an aerodrome. This service commenced on 12th August, 1923.

International difficulties which had prevented Daimler Hire, Limited, operating their service beyond Amsterdam were overcome by 16th April, 1923, when they opened a through service to Berlin, calling at Bremen and Hamburg. This service, which was operated in conjunction with the Deutscher Aero-Lloyd, was so arranged that Daimler Hire, Limited, should run one through return service a week from London to Berlin, the Deutscher Aero-Lloyd operating a similar weekly return service. On the remaining days of the week it was intended that the machines of Daimler Hire, Limited, should meet those of Deutscher Aero-Lloyd at Amsterdam, where an exchange of passengers, mails and goods should take place.

Owing to difficulties which the German Company experienced with regard to material, these arrangements did not work satisfactorily, so eventually Daimler Hire, Limited, increased their services to three return trips a week to Berlin.

On 4th November, 1923, Daimler Hire, Limited, in agreement with the Deutscher Aero-Lloyd, altered their route to Berlin to run *viâ* Hanover. This was done owing to the shortening hours of daylight making a shorter route advisable.

On 16th August, 1923, Handley Page Transport, Limited, in agreement with the Swiss Government, from whom they received a subsidy, extended the London-Paris route to Zurich *viâ* Basle. At the commencement of this service three return trips a week were made, but on 5th October, 1923, the service was reduced for the winter months to one return trip per week, which was maintained until the close of the subsidy period on the 31st March, 1924. For this service a British subsidy was granted at the rate of 50% per flight between Paris and Zurich, with a maximum subsidy payable of 6,000%.

During July, 1923, an agreement was entered into with the Government of Czechoslovakia for the extension of the Instone line from Cologne to Prague. This agreement allowed for a maximum of 60,000 miles to be flown between the date of inauguration of the service and the 31st March, 1924. The British Government allotted a maximum subsidy of 6,750% and the Czechoslovak Government a maximum subsidy of 6,000% for this service. Owing, however, to international complications with regard to flight over German territory, this service was not put into operation.

In addition to the above mentioned subsidies, each of the three first-named companies were entitled to receive a grant in aid towards the purchase of material to the extent of 30 per cent. of the amount expended by firms on complete aeroplanes and engines, provided that no payment in excess of 15,000% would

be made to any one company; in the case of the fourth company the figures were 50 per cent. and 21,000*l.* respectively. The report of the committee known as the Hambling Committee, having been accepted by the Government, the individual existence of each company was due to terminate on the 31st March, 1924, and consequently the firms were disinclined to saddle themselves with further new equipment.

In view of this and by reason of the fact that by July, 1923, certain of the firms had completed their quota of mileage, it was decided to increase the scheduled number of flights to meet which the total annual subsidy would be increased. This subsidy was calculated at a standard rate of approximately 1*s.* 9*d.* per mile with the proviso that in no case should the amount paid in increased subsidy, plus payments made in respect of assistance towards purchase of material, exceed the sum of 15,000*l.*, which, as previously stated, remained unspent from the amount which had been allotted originally for the provision of material only.

All of the four operating firms referred to above terminated their individual existence on the 31st March, 1924, when they were combined into the new company—Imperial Airways, Limited—to which reference has already been made.

On the recommendation of the Air Mails Committee (*see* page 5), an experimental mail service was operated for one month from Plymouth to Belfast, *viâ* Manchester. The object of this service was to prove that if American mails were landed at Plymouth, such a considerable saving in time could be effected by transporting them by air to Belfast, that it would be possible for the return mails to catch an earlier boat from Southampton on the return journey to America than would normally be the case. This service commenced on 15th September, 1923, and taking into consideration the time of the year, the exceptionally bad weather conditions prevailing and the lack of proper ground organisation, a remarkable degree of regularity was achieved. The success of this experiment was due in a large measure to the enthusiasm and cordial co-operation of the Lord Mayor and other city officers of Plymouth and Belfast.

Following this experimental service, negotiations with the city authorities and the Chambers of Commerce of Manchester and Belfast have been opened by a private concern for the operation of a daily unsubsidised service between these two towns. This scheme envisages chartering D.H.50 machines from the De Havilland Aircraft Company. The Lord Mayor and Corporation of Belfast have declared their intention of providing a municipal aerodrome at Belfast if this service matures.

Miscellaneous Services, &c.

During the period under review, the air taxi machines operated by the De Havilland Aeroplane Hire Service have carried out flights to practically every country in Europe, and flown a total of over 165,000 miles. An increase in demand for this service

resulted in the firm increasing its fleet during the year from 8 machines to 15 machines, including those under construction.

In addition, this company produced during the year a new type of commercial hire service aeroplane which was successful in obtaining the premier award for machines of its class at an international competition held at Gothenburg, in August, 1923.

The Savage Sky-writing Company operated a fleet of 18 single-seater machines and had a further 9 similar machines under construction at the end of March, 1924. This company confined its activities in aerial advertising almost entirely to the United States of America, owing to the great demand for its services in that country. 2,250 hours' flying on actual sky-writing publicity work was carried out in the U.S.A. during the year, and a small amount of similar work was successfully completed in Scandinavia. The company's work in the United Kingdom was confined solely to test and experimental flying.

The use of aerial photography for commercial purposes has increased considerably during the period under review; a considerable amount of such work has been carried out in the Dominions, where conditions are more favourable to aerial survey on a large scale, the survey of the Irrawaddy Delta by air being an example of the rapidity and economy possible by this method, when the survey of large tracts of such territory is required.

In the United Kingdom, Aero Films, Limited, have carried out over 120 hours' actual flying in the execution of their aerial photographic work, adding to their stock considerably more than 10,000 general views of commercial, historical, geographical and scenic subjects, which are of value for reproduction in various classes of educational and advertising pamphlets. This company were officially appointed by the British Empire Exhibition to record periodically the progress of work on the construction and development of the exhibition buildings and grounds, and were also appointed as the official aerial photographers by the Metropolitan police during Derby day and Epsom race week, 1923, when photographic records of traffic were made to assist in the control of such traffic on future occasions. The company's activities have also embraced the survey of large estates, factories, and areas for town-planning schemes by various municipalities.

The Central Aero-Photo Company, Limited, have also made steady progress in the work of photographing factories, and estates, &c., for advertising and selling purposes, and have carried out an increased amount of mosaic survey work.

A third company, Airco Aerials, Limited, also report a satisfactory increase in the class of work in which they specialise.

Statistics of the flying carried out during the year are given in the tables and summary thereof on pages 23-26.

Proposed Experiments in night flying.

During the year an endeavour was made to continue the experimental flying by night on the London-Paris route which

had been inaugurated during the month of February, 1923; it was intended to operate a large twin-engined commercial machine for a period of approximately two months during the autumn of 1923 and to aim at completing at least 60 night flights between the two capitals.

The organisation and arrangements necessary to this experiment were prepared, but owing to financial stringency it was decided to abandon the proposal. Arrangements were made, however, for the testing out on a much simpler scale of sundry night flying and lighting equipment for use on commercial routes.

ESTIMATES, 1924-1925.

The estimates for civil aviation in 1924-25 (Air Estimates : Vote 8) provide a total net sum of 355,000*l.*

36,000*l.* is provided for the staffing and upkeep of civil aviation aerodromes; 34,000*l.* for aerial routes, surveys, &c.; 10,000*l.* for technical equipment; 148,000*l.* for works, buildings and lands (including a sum of 97,800*l.* for purchase of land, the greater amount of which is in connection with the purchase of additional land for the extension of the London Terminal Aerodrome, Croydon, 29,500*l.* for the improvement of the aerodrome by the diversion of Plough Lane, and 5,000*l.* for initial expenditure in connection with an extensive scheme for the reorganisation of the buildings and accommodation); and a sum of 137,000*l.*, which is the subsidy payable for the year ending 31st March, 1925, to Imperial Airways, Ltd.

In addition, a sum of 16,086*l.* is estimated as the cost of the headquarters' staff of the Directorate of Civil Aviation (Air Estimates : Vote 10).

The receipts at civil aviation aerodromes, the fees for licences and certificates, &c., are expected to amount to 13,000*l.*

AIR NAVIGATION REGULATIONS.

As from 1st January, 1924, the Air Navigation Orders, 1922 and 1923, were revoked and replaced by the Air Navigation (Consolidation) Order, 1923. At the same time the Air Navigation Directions, 1922 (A.N.D. 3), were amended as necessary in order to bring them into line with the new Order.*

Additional directions were issued on 6th November, 1923, approving as customs aerodromes the Manchester aerodrome (Alexandra Park) and an area at Southampton (Woolston); and also on 8th November, 1923, regulating the landing and taking off of aircraft at Croydon and Lympne aerodromes.†

* A.N.D.3A., A.N.D.3B. and A.N.D.3c. (H.M. Stationery Office, 1*l.* each, net.)

† A.N.D.4A. and A.N.D.5. respectively. (H.M. Stationery Office 1*l.* each, net.)

LICENCES AND CERTIFICATES.

The following licences and certificates have been granted during the period under review :—

	New Licences or Certifi- cates issued during the year.	Renewals during the year.	No. of Licences or Certifi- cates current on 31/3/24.
Licences for Pilots - - -	63	221	135
Licences for Navigators - -	1	3	3
Licences for Engineers - -	—	—	—
Licences for Ground Engineers	71	202	274
Licences for Aerodromes - -	117	17	37
Certificates of Registration :—			
Heavier-than-Air Craft - -	113	97	192
Lighter - than - Air Craft (Balloons) - - -	—	6	6
Certificates of Airworthiness -	112	54	153
Journey Log Books - - -	41	—	—

New forms of licences for personnel, agreed upon by the International Commission for Air Navigation, have been introduced during the period under review, also a new form of certificate of airworthiness and a revised form of journey log book.

It has been decided to amend the conditions covering the issue of a private pilot's licence as from the 31st March, 1924, by the introduction of medical examinations and by requiring candidates to produce evidence that they have had not less than three hours' solo flying during the 12 months preceding the date of application for a licence or for the renewal of licence.

AIRSHIPS.

During the period under review a proposal was put forward by Commander Burney for the construction of an experimental airship of 5,000,000 cubic feet with a view to the inauguration and maintenance of a commercial airship service to India. This was considered by the Committee of Imperial Defence and at a later date by a Sub-Committee of Cabinet.

In accordance with the recommendations of the Cabinet Sub-Committee, Commander Burney's scheme was not proceeded with. Instead of that scheme the Air Ministry is to undertake the construction of a 5,000,000 cubic foot airship, together with the necessary preliminary research and experimental work and the organisation of an airship route to India including the provision of a shed and mooring mast base in India and an intermediate mooring mast base on the route.

In addition, a contract is being placed with the Airship Guarantee Company (Commander Burney's Group) for the construction of a second 5,000,000 cubic foot airship at a fixed price. While the Air Ministry ship will be constructed with a view to Imperial requirements, the second ship will be designed for commercial purposes. The company are to have the option of purchasing the ship back from the Air Ministry at a reduced figure provided that—

- (1) It is to be operated in connection with an approved British commercial airship service, and
- (2) It shall be available for use by the State as required.

TRAINING OF RESERVE OFFICERS.

As foreshadowed in the last report, four civil schools for the training of the Royal Air Force Reserve of Officers have been established. The dates upon which these schools were opened and the output of pupils who completed their training prior to 31.3.24 are as follows :—

	Date of opening of School.	No. of pupils trained.
The De Havilland Flying School, Stag Lane, Edgware - - - - -	1.5.23	97
The Bristol Aeroplane Co., Ltd., Filton, Bristol - - - - -	28.5.23	70
W. Beardmore & Co., Ltd., Moorpark Aerodrome, Renfrew, N.B. - - -	24.7.23	48
Sir W. G. Armstrong-Whitworth Aircraft, Ltd., Whitley Aerodrome, Coventry -	30.7.23	30
Total - - - - -		<hr/> 245 <hr/>

Each school is equipped with three preliminary training machines and at least three advanced training machines, and facilities for ground instruction have also been provided. Normally, pupils are given a course of up to 24 days per annum divided into quarterly or half-yearly periods. The course may be extended up to a maximum of two months for those who, on first joining the Reserve, are considerably out of practice in flying.

Arrangements have been made for the opening of a fifth school, for the training of pilots on twin-engined aircraft, at Brough, near Hull. This school will be under the management of the North Sea Aerial and General Transport Co., Ltd. It is hoped that this school may also be able to undertake the training of seaplane pilots.

EXHIBITIONS, COMPETITIONS, &c.

To enable British aircraft and aero-engine constructors to display their products on a proper scale at the International Aeronautical Exhibition held at Gothenburg (Sweden) from 20th July to 12th August, 1923, arrangements were made whereby one half of the expenses incurred in exhibiting, up to a maximum of 9,500*l.*, were met by the Government, and certain aircraft material constructed to the order of the Air Ministry was released for the purpose of exhibition. An air traffic reliability competition held in connection with the exhibition was won by a British machine, the D.H. 50, as previously mentioned.

In October 1923, a light aeroplane competition, initiated by the Duke of Sutherland, a former Under Secretary of State for Air, was held at Lympne. To the Duke of Sutherland's prize of 500*l.* other prizes were added, amounting in value to 1,900*l.*

Twenty-one machines, of which eighteen were British, took part, and all the prizes were won by British machines. The winners of the principal prizes—for fuel economy—accomplished 87.5 miles to the gallon. For the subsidiary prizes, the winners of the respective contests attained :—

Maximum altitude	-	-	-	14,400 feet.
„ speed	-	-	-	76.5 miles per hour.
„ mileage over set course	-	-	-	1,000 miles.

As a result of the competition the British aircraft industry has gained a leading place in light aeroplane construction.

Two fields of utility already exist for light aeroplanes. They can be used (a) for instructional purposes in place of the heavier and more expensive machines now employed, and (b) as a means of travel in many parts of the Empire where, as in Australia, flying, if not costly, would be of immense benefit to settlers. With the view of encouraging the production of a light two-seater aeroplane suitable primarily for training purposes, the Air Ministry has offered prizes to the value of 3,000*l.* for a two-seater light aeroplane competition to be held in September, 1924. The conduct of this competition is in the hands of the Royal Aero Club.

The following events, in addition to the Light Aeroplane Competition, were organised by the Royal Aero Club during the period under review :—

(a) The Grosvenor Cup Race, starting and finishing at Lympne, in June 1923.

(b) The Aerial Derby and Air League Cup at Croydon in August 1923.

(c) The Schneider Cup Race at Cowes in September.

Civil aviation is well represented at the Government Pavilion, British Empire Exhibition. A Government Departmental Committee, on which the Air Ministry was represented, was formed to undertake the preparation of a Government exhibit. As regards

civil aviation, it was recognised by this committee that the exhibition of complete aircraft by the aircraft industry was an impossibility owing to the large space that would be needed and the great expenditure to the industry that would be involved. The committee therefore decided that aviation should be given as prominent a display as possible in the Government Pavilion by means of models, &c., and, in addition, that a sum of 4,000*l.* should be made available to the industry as a contribution towards the cost of organising an exhibition of aircraft and flying at an aerodrome within reach of Wembley. It was intended that this aerodrome should be available for people arriving by air to visit the Exhibition and should be known as the Airport of the British Empire Exhibition. Unfortunately, however, the high cost of organising such an air exhibition proved an insurmountable difficulty, and civil aviation activities had therefore to be confined to the Government Pavilion alone.

Large mechanical models were made illustrating (a) the air route to the Continent, (b) the organisation of a modern airport, and (c) the organisation of a civil airship base. Exhibits illustrating the technical aspects of aviation were prepared in conjunction with exhibits relating to the Royal Air Force, and special cinematograph films were made to show the actual working of the airways. Further, a daily demonstration was arranged by the Meteorological Office of the methods by which weather forecasts are compiled.

GROUND ORGANISATION.

Air Ports and Landing Grounds.

A scheme for the expansion of Croydon aerodrome is proceeding. Additional land on the west of Plough Lane and the present aerodrome has been acquired, and the diversion of Plough Lane and the construction of a new road to take its place is being discussed with the local authorities concerned and the Ministry of Transport. It is proposed eventually to demolish the existing buildings, with the exception of hangars, and to replace them with permanent buildings designed specially for the needs of a commercial air port. The first part of the work to be undertaken will be the provision of additional hangars, which are urgently required. A considerable amount of work has been carried out in improving the surface of the present aerodrome.

Traffic at Lympne aerodrome has shown an increase, due to the running of a newspaper services from this aerodrome.

In connection with the service between London and Manchester a short lease of Manchester aerodrome, expiring on the 31st August, 1924, was obtained, and a Civil Aviation Traffic Officer was posted to this aerodrome in September, 1923. Apart from regular air traffic the aerodrome has also been used considerably for joy-riding purposes.

A lease of Renfrew Aerodrome (Glasgow) has been secured and considerable improvements to the surface of the aerodrome and repairs to the hangars have been carried out. This aerodrome is chiefly used by Messrs. William Beardmore and Company, Ltd., for their Reserve Training School.

There has been little traffic at Castle Bromwich (Birmingham) aerodrome during the period under review, but the aerodrome has been available as a port of call in connection with the London-Manchester service, and the experimental flying on the Plymouth-Manchester-Belfast route.

On the cross-Channel route from Croydon emergency landing grounds are maintained at Penshurst, Marden and New Romney. Penshurst, where there is shed accommodation, has been used considerably, and accommodation for H.M. Customs has been provided at this landing ground. A caretaker is employed and a telephone is available.

Navigation.

Experience in the application of the supplementary rules of the air designed to obviate risk of collision has led to modifications which will give the rules more general application. These modifications have been agreed on by the Belgian, Dutch, French and British Governments, with the result that procedure will be uniform in these countries. It is hoped that the I.C.A.N. will adopt the modified rules.

The system of control from the Croydon aerodrome of aircraft in flight on the London-Continental routes, introduced during 1922, has continued to be of the greatest value and assistance to the successful operation of these routes and will be further developed from time to time.

A series of flights on the Continental air routes has been carried out by navigation officers from the Air Ministry with a view to the recommendation of improvements in methods and instruments used for navigation.

Recommendations have been submitted to the I.C.A.N. for a revision of the conditions of issue of navigators' licences.

The question of applying the science of acoustics to the problems involved in locating the position of an aircraft during adverse weather conditions has received further close study in conjunction with the Acoustical Section of the Royal Engineers, War Office. The experiments carried out at Croydon aerodrome proved that interference from local noises on the aerodrome was too great to admit of satisfactory results being obtained. Further experiments are being carried out in a more favourable location to determine in what way the difficulties referred to can be overcome.

The marking of the names of towns, railway junctions, &c., in large letters visible to airmen by day has been further extended in continuation of the policy laid down. In addition, the international agreement whereby the names of all aerodromes available

for public use shall be marked has been given effect at a number of aerodromes in England.

As a further step in the equipment of the British section of the Continental air routes with apparatus designed to facilitate night flying, two medium power automatic lights are being placed on the emergency landing grounds at Penshurst and Littlestone. These lights are intended to assist pilots to locate the landing grounds in the event of a forced landing at night, and will be visible at distances up to about 18 miles; the lights are entirely automatic, and function without attention for periods of six months or longer.

Experimental work on various systems of lighting designed for mist penetration has proceeded satisfactorily, particular attention having been paid to the development of a high-powered Strontium Beacon for use on aerodromes. The system employed shows considerable promise, the high-intensity red light exhibited being notably distinct under atmospheric conditions which militate against the efficiency of white lights.

The "flood-light" system has now been definitely accepted as the optimum standard for lighting large civil aerodromes at which a considerable volume of night traffic is to be handled, and aerodromes additional to Croydon will be equipped with this system as required.

The necessity has been shown of outlining the boundaries of aerodromes and landing grounds during the hours of darkness. To meet this requirement, lighting equipment has been produced which will efficiently and economically indicate to a pilot the exact area within which he may safely land his machine, and the aerodromes and landing grounds on the London-Lympne route will be supplied with this equipment as early as possible.

Wireless Communications.

A considerable amount of further work on aerial navigation by wireless direction finding has been carried out during the past year by the stations at Croydon and Pulham, and the pilots of aircraft have shown increased faith and aptitude in this aid to the safety and regularity of the services. As a result on several occasions aircraft have been enabled to complete journeys which would otherwise have proved impossible owing to adverse weather conditions.

The following example of the utility of the direction finding service may usefully be quoted:—

On 21st November, 1923, an aircraft left Croydon at 1030, bound for Cologne. The weather conditions of the route at the time of leaving were very unfavourable; at Lympne, for example, the visibility was only 300 yards, and the clouds were down to 150 feet.

Before leaving the aerodrome, the pilot informed the wireless station that he was going to depend on direction finding to take him through. Four D.F. positions were passed to the machine

between 1040 and 1133 hours, during which period the aircraft was flying at 3,500 feet and the pilot did not see ground at all. At 1133 the pilot informed Croydon that he would go down and endeavour to see ground and a few minutes later he reported that he was three miles W. of Dunkerque, which tallied with the position in which he should have been, following the last position given by the D.F. stations.

In a letter to the Director of Civil Aviation, written on the 28th November, 1923, regarding this flight, the pilot said :—

“ . . . I feel that it is very often possible to use Directional Wireless, and so increase the percentage of reliability of any service . . . During the flight mentioned, it was impossible to see either the ground or the sky at all for the first hour and twenty minutes, and in any case the course necessitated flying through snowstorms in clouds, and had it not been for Croydon's invaluable help, it would undoubtedly have been impossible to have got through.”

On the 12th November, 1923, the same pilot carried out a D.F. exercise with Croydon when conducting an engine test flight in the vicinity of the aerodrome. At 1048 hours he called for a position, which was given to him by the D.F. stations as 24 miles S.W. of Croydon. He then asked for a series of true bearings from Croydon on which he might set his course to return to the aerodrome. Three bearings were given him by the Croydon station between 1048 and 1100 hours, and at a few minutes past 1100 hours the machine was seen over the S.W. corner of the aerodrome and the pilot informed accordingly. The pilot, on landing, stated that he had entirely neglected to study ground land marks during this flight, and had, as a test, navigated his machine entirely on the bearings given by the Croydon station.

These incidents show good examples of the main objects of D.F. on civil air routes :—

(1) to enable pilots to get through when weather conditions are bad over the whole route, or at one particular point on a route.

(2) To guide incoming pilots when approaching in thick weather the aerodrome of destination.

Steps are being taken to instal a third direction finding station within the British area, at Lympne, and it is expected that this station will be in operation during the coming summer months.

Direction finding stations for aircraft are also in process of erection in Belgium, Holland and France, and these also are expected to be available for use this year. Preliminary arrangements have been made to carry out tests between all these direction finding stations as early as possible with a view to establishing a scheme of international routine for aircraft requiring navigational assistance by this method.

By arrangement with the German Government the wireless telegraph stations at Berlin and Hanover now carry out signalling

on the air traffic wave length, thereby conforming to the routines in force between Great Britain, France, Belgium and Holland.

Various improvements have been effected in the signalling procedure both in communicating with aircraft and with ground stations. It is of interest to note, in this connection, that the British operators at the route ground stations are proficient in radio telephony procedure in French and able to converse well in that language.

The aircraft on the service between Southampton and the Channel Islands have now been equipped with wireless, and a station has been opened at Guernsey. Under an agreement with the Post Office this station also undertakes public traffic if serious delays occur on the cables at any time between England and Guernsey.

A comprehensive series of tests has been carried out to determine the range of the Air Ministry station at Kidbrooke when broadcasting meteorological synoptic reports and forecasts of interest to shipping. Reports which have been received from various British shipping companies show that a range of about 1,500 miles is readily obtainable.

Improvements have also been effected in that transmitting section of the same station which deals with air traffic signals to foreign stations and have satisfactorily overcome previous difficulties in communication during bad atmospheric conditions.

Provision has been made for remodelling the Cologne aerodrome station during the current year, and for the installation, if required, of a wireless station at Belfast, for communicating with aircraft on the Liverpool-Belfast route.

Meteorology.

The meteorological service for civil aviation has been maintained on much the same lines as in the previous year.

On the London-Continental routes the service of hourly route reports commenced at 3 a.m. G.M.T. during the summer months and at 5 a.m. G.M.T. during the winter months.

As from 1st May, 1923, an arrangement came into force whereby warning of the occurrence of a squall or thunderstorm in the vicinity of these routes is broadcasted immediately for the benefit of all concerned.

On the London-Manchester route the meteorological arrangements have been varied from time to time to meet the changing requirements of the aircraft services.

Between 15th September and 19th October, 1923, an extemporised meteorological service was provided for the benefit of the experimental mail service on the Plymouth-Belfast route. By arrangement with the Mercantile Marine Department of the Board of Trade and Trinity House respectively, additional weather reports were sent regularly from the Coast Watching Station at Port Patrick and from the Lighthouse at St. Bees.

Since September, 1923, arrangements of a more or less provisional nature have also been in operation to provide meteorological

logical advice in connection with the Southampton-Guernsey service. The meteorological station attached to the Royal Air Force at Calshot serves as a centre for the preparation of forecasts, weather reports being received from the W/T station at Guernsey and from the Coastguard Station at St. Catherine's Point, Isle of Wight.

In connection with the consideration of airship schemes, two reports have been prepared on the meteorological organisations now existing or likely to be required, the first on an airship route from England to India, the other on a route from India to Australia.

Throughout the winter opportunity has been taken to analyse such meteorological data collected in recent years as seemed likely to be of further value for purposes connected with aviation. For the most part the results are still in manuscript, and the intention is to improve and keep them up to date and in such form as to be more readily available for the extraction of information than were the original masses of undigested data. The following matter has been prepared :—

(1) Comparative summaries (by seasons) of the frequency of fog, mist and cloud of various heights at 16 representative stations (mostly aerodromes) in the British Isles.

(2) Tables and diagrams showing the average variation throughout the 24 hours (again by seasons) of the frequency of occurrence of fog, mist, cloud below 500 feet, cloud below 1,000 feet, and cloud below 8,000 feet.

(3) Tables showing the frequency of occurrence of winds from the different directions (classified also as to force) for various heights up to 30,000 feet.

(4) The variation of wind at a fixed height with respect to time (up to 12 hours) and place (up to 100 miles distant).

Aeronautical Maps.

General Aeronautical Series.—A world index for the general aeronautical maps has been prepared and approved of by the International Commission for Air Navigation.

A conventional sign sheet has also been prepared and proofs passed, with the exception of a few minor corrections, by the International Commission. A combined edition of the world index and conventional sign sheet will shortly be printed for distribution and sale (price 2s. 6d. net).*

The state of the work on the British sheets of the general aeronautical series is as follows :—

Egypt.—An edition (fully coloured) of 300 copies has been printed and published (price 4s. paper, 4s. 6d. linen backed).*

* Obtainable from :—E. Stanford, Ltd., 12, Long Acre, W.C.; Sifton, Praed & Co., 67, St. James Street, S.W.; T. Fisher Unwin, 1, Adelphi Terrace, W.C.; W. & A. K. Johnston, Ltd., Eastern Road, Edinburgh; and Philip, Son and Nephew, 20, Church Street, Liverpool.

Oman.—An edition (fully coloured) of 300 copies has been printed and published (price 4s. paper, 4s. 6d. linen backed).*

Iraq.—An edition (fully coloured) of 100 copies has been printed and published (price 4s. paper, 4s. 6d. linen backed).*

Britain.—Corrections to plates bringing this sheet up to date (January, 1924) have now been made and when approved an edition will be printed for publication.

Balkans.—Amendments are now being done on the plates and when approved an edition will be printed.

Kordofan.—The working drawing of this sheet has been done and draughtsmen are now engaged upon preparing the plate drawings. This map will be produced in 1924.

Yemen.—The working drawing of this sheet has been done and draughtsmen are now engaged upon preparing the plate drawings. This map will be produced in 1924.

Baluchistan.—The working drawing of this sheet has been done and draughtsmen are now engaged upon preparing the plate drawings. A provisional edition of the southern half only will be produced early in 1924.

Kurile Islands, Kamchatka, Komandoski Is., Aleutian Is., Alaska Peninsula.—A skeleton edition in five colours only has been prepared. This edition can only be considered as in the proof stage.

Local Aeronautical Series.—British Isles.

Sheets 11 and 12 of this series are still in the proof stage. Aerial information has been brought up to date (January, 1924) and the plates are being corrected.

TECHNICAL SERVICES.

Two types of three-engined commercial aircraft are under construction and two more are in the design stage to the order of the Air Ministry.

Of those under construction, one is a Handley-Page (type W.8.F.) a modification of the W.8.B. which has been regularly operated on the cross-Channel route. This machine is fitted with one Rolls-Royce "Eagle" engine in the nose of the fuselage and two Siddeley "Puma" engines in separate nacelles on each side of the fuselage. The weight fully loaded is 12,000 lbs., and the cabin is fitted to carry 10 passengers.

The other is an all-metal machine which has been specially designed for long-distance flights, up to about 2,000 miles, on the Imperial air routes.

* Obtainable from :—E. Stanford, Ltd., 12, Long Acre, W.C.; Sifton, Praed & Co., 67, St. James Street, S.W.; T. Fisher Unwin, 1, Adelphi Terrace, W.C.; W. & A. K. Johnston, Ltd., Eastern Road, Edinburgh; and Philip, Son and Nephew, 20, Church Street, Liverpool.

The two experimental three-engined types in the design stage will both be constructed, in the first instance, of wood. As they are being designed to a specification for machines suitable for transport in the Middle East, if the experimental machines prove to be satisfactory, further aircraft of the same type can be constructed in metal. One of these machines will be fitted with three Bristol "Jupiter" engines and the other with three Siddeley "Jaguar" engines.

Two new experimental single-engined types, suitable for cross-Channel service, are also under construction. One of these will be fitted with a Rolls-Royce "Condor" engine and the other with a Bristol "Jupiter." The specifications for these machines call for a high top speed with a low landing speed, together with an increase in useful load per horse-power over that given by any machine at present in existence.

One of these machines will be fitted with a Handley-Page slotted wing, and the other with the De Havilland wing flaps.

The Supermarine twin-engined amphibian boat seaplane, mentioned in the previous report, has been successfully flown and will shortly be put into commission. A seaplane of special type intended for long-distance flights is being produced by the Fairey Aviation Company. Fitted with a Rolls-Royce "Condor" engine of 650 H.P., it will carry a crew of five and will have a range of about 1,700 miles in still air.

The question of the best type of metal construction for civil use is being explored, and machines representing the different types of construction are being built for experimental purposes. Three different systems of construction are being experimented with and it is believed that all three will be satisfactory for transport purposes.

Experiments are proceeding to ascertain for how long it is possible to keep an aircraft afloat in the event of a forced landing on the water.

Continuous research is proceeding as to the control of aircraft, at low speeds, and it is hoped, as the result of these tests, to improve the controls of aircraft to such an extent that effective control will be maintained even if the aeroplane stalls.

Particular attention has been paid during the year to the construction of engines with cylinders fitted with sleeve valves, especially with a view to obtaining greater reliability and obtaining engines more suitable for civil aviation. Two complete engines of 450 H.P., incorporating this feature, are now under construction.

Considerable advance has been made with the compression-ignition engine using heavy oil.

In connection with the development of the organisation for night flying on the the British section of the cross-Channel route, a number of night flights have been carried out between Croydon and Lympne.

Half-scale tests of the "Leader Cable" device for landing in fog carried out at the Royal Aircraft Establishment have given promising results.

Among aircraft instruments which have been undergoing tests, the Sperry, Reid and Shilovsky type turn indicators have been found to give good results.

Air Transport Sub-Committee (Aeronautical Research Committee).

Six meetings have been held during the year under review. The purpose of the Sub-Committee is to act as a co-ordinating body between the Directorate of Civil Aviation and the Technical Sub-Committee of the Aeronautical Research Committee. In the first instance the Sub-Committee dealt with the lack of data on the subject before them and made recommendations as to investigations to be undertaken.

Among the subjects which are receiving the attention of the Sub-Committee may be mentioned :—

- (1) Economics and reliability of air transport.
- (2) Instruments.
- (3) Meteorology.
- (4) Night flying.

A number of the staff of the National Physical Laboratory, under the direction of the Sub-Committee, has commenced a general investigation into the problems of economic flight, and a certain amount of experimental work, initiated by the Sub-Committee, is to be carried out at the Royal Aircraft Establishment and the Experimental Station at Martlesham Heath.

MEDICAL SERVICES.

The routine medical examinations of pilots may now be considered as an essential link in the chain of factors that help towards making aviation as safe as it is to-day. Since the inception of medical examinations for civil pilots five years ago, there has not been any accident that could in any way be attributed to the physical condition of the pilot holding a "B" (public transport) licence. Of this fact insurance companies take cognisance in the reduced rates they offer to holders of "B" licences.

As a result of the proved value of periodical medical examinations as one of the best insurances against accident or illness, it has been decided to initiate a simple form of medical examination for persons desirous of holding "A" (private) licences. These examinations will be carried out by the pilots' own medical practitioners, and the results considered and assessed at the Air Ministry. Although such a method will fall short of the present high standard for "B" licences, yet it will give a reasonable guarantee that only reasonably healthy individuals will be allowed to pilot aircraft.

The Medical Branch of the Civil Aviation Department continues to be engaged in investigations that may, it is hoped, throw further light upon such important questions as basic physical condition, flying fatigue, number of years of useful flying life, sense of direction, night vision, &c., &c.

INVESTIGATION OF ACCIDENTS TO CIVIL AIRCRAFT.

Under the Air Navigation (Investigation of Accidents) Regulations, 1922, all accidents arising out of or in the course of air navigation which occur in or over Great Britain and Northern Ireland, or which occur elsewhere to British aircraft registered in Great Britain and Northern Ireland may be investigated by the Inspector of Accidents.

BRITISH AIRCRAFT.

Apart from trivial occurrences not calling for special investigation, a total of twenty-six accidents occurred during the year ending the 31st March, 1924, to British aircraft so registered.

Six accidents resulted in loss of life but only one of these involved passengers, the other five having occurred during "solo" flights for the purpose of test, competition or private flying.

With the exception of the one fatal accident, which occurred on an established air route, no person carried in an aircraft registered in the British Islands and flying for hire or reward was injured to any serious extent during the period under review.

Causes of Accidents.

The following table gives a broad classification of accidents to British civil aircraft during the year ending 31st March, 1924 :—

	(a) Error of of judgment on the part of the pilot or crew.	(b) Defect in air- craft structure or con- trols.	(c) Defect in engine or installa- tion.	(d) Weather con- ditions.	(e) Other causes.	Totals.
(1) Established Air Routes.	2	—	1	1	1	5
(2) Hire Services -	—	—	—	—	1	1
(3) Short Passenger -	6	—	3	—	—	9
(4) Constructors' trials, &c.	2	—	1	—	—	3
(5) Competitions -	1	1	—	—	—	2
(6) Schools -	1	—	2	—	—	3
(7) Private Enterprise	1	1	1*	—	—	3
	13	2	8	1	2	26½

* An aeroplane registered in Great Britain but designed and built in America and flown by an American subject.

1. *Established Air Routes.*

Column a.—The same pilot was involved in both accidents under this heading. In the first case the aircraft swung round across wind when taking off from an aerodrome and finally crashed into a fence.

In the second case, the pilot stalled the aeroplane at a low height when manœuvring to land, owing to bad weather. This accident resulted in fatal injuries to all occupants of the machine, *i.e.*, the pilot, the second pilot and three passengers.

Column c.—A petrol tank sprung a leak during flight. In the subsequent forced landing, the aircraft over-ran the field and fell into a sunken road.

Column d.—The pilot was obliged to attempt a landing on the sea-shore owing to thick fog. The wheels of the undercarriage sunk in the soft sand, and the aeroplane turned over on to its back.

Column e.—This was an accident to a flying boat, the cause of which could not be determined. The pilot was flying at a very low height, approaching his base, when the boat struck the water heavily and was wrecked. The sea was dead-calm, and the weather was misty at the time. The pilot appears to have misjudged his height above the water, but the possibility that he was struck on the head by a bird, during flight, cannot be entirely dismissed.

2. *Hire Services.*

The only accident in this category might be classified under "Misadventure," and was not of a serious nature. The aeroplane struck a hedge when the pilot was attempting to take off after a voluntary landing in a small field.

3. *Short "Passenger Flights."*

Column a.—In one case the pilot made a turn over the sea at too low a height, and the wing tips of the aeroplane struck the water. In two cases the pilot misjudged his approach to the landing ground, and two accidents were due to the aeroplane colliding with an obstacle on the ground when taking-off. The remaining case was one of engine failure, owing to the pilot's mishandling of the controls, followed by error of judgment when landing.

Column c.—Of the three accidents under this heading, one was due to engine seizure caused by a piece of paper in the oil tank, one to a fatigue fracture of a connecting rod, and one to some defect in the petrol system which could not be determined owing to interference with the wreckage of the machine after the accident.

4. *Constructors' Trials, &c.*

Column a.—One accident, with fatal consequences, was due to an error of judgment on the part of the pilot causing the

aeroplane to lose flying speed in a turn near the ground preparatory to landing. (The aeroplane was a single seater fighter designed for the Service.) The other accident under this heading was due to the aircraft striking a hedge when the pilot was attempting to land, on a cross-country flight, owing to slight engine trouble.

Column c.—During a test flight of a racing machine, the engine failed completely, and the pilot was unable to avoid collision with trees. Part of the valve timing gear is believed to have fractured.

5. *Competitions.*

Column a.—When taking off in the Schneider Cup contest the pilot failed to retain control of the aircraft with the result that the machine was wrecked before it left the water.

Column b.—During the last stage of the Grosvenor Cup race, the port wing of the monoplane aircraft collapsed, the structural failure was due to fatigue fracture of an antilift wire fitting. The pilot was killed.

6. *Schools.*

Column a.—The pilot, a pupil on his third solo flight, lost his way and when manœuvring to land he stalled the aeroplane, in a turn at a low height, with fatal consequences.

Column c.—In one case the engine failed, owing to an ignition defect, as soon as the aeroplane had left the ground. The instructor was obliged to turn to avoid collision with trees, and in so doing, he lost control of the aeroplane, which fell to the ground. The instructor was seriously injured, but the pupil was unhurt.

The other case was one of fire in the air, caused by a fracture of the outlet boss of the petrol tank. The pilot succeeded in landing the aircraft under control and escaped injury of any consequence.

7. *Private Enterprise.*

Column a.—The aeroplane was wrecked through an error of judgment on the part of the pilot when landing. The pilot was unlicensed.

Column b.—This accident, which resulted in fatal injuries to the pilot, occurred to an experimental and uncertificated aircraft and was due to defects in the aerodynamic qualities of the machine.

Column c.—Shortly after starting to cross the English Channel the pilot was forced to descend owing to a complete failure of the engine. After making a successful "landing" the pilot was drowned in an attempt to swim ashore. The engine failure was due to warping and consequent seizure of the valves.

FOREIGN AIRCRAFT.

French nationality.—Four accidents occurred in this country to French aircraft employed on the cross-Channel Services, the circumstances of which were as follows :—

(1) The port engine seized, owing to a fracture of the oil pump spindle. The pilot succeeded in reaching an aerodrome, but when about to land, the aircraft collided with a building, and was wrecked.

(2) The starboard engine crankshaft fractured during flight, and when the pilot was manœuvring to land, the aircraft lost flying speed, and nose-dived to the ground. Seven of the nine passengers were injured (four seriously), one was killed, and one escaped unhurt. The pilot and mechanic were also injured, the latter seriously.

(3) The aeroplane ran into a ditch when the pilot was attempting to land, owing to bad weather. The presence of sheep on the landing ground contributed towards the accident.

(4) The aeroplane landed heavily on sloping ground at the extreme end of the aerodrome, with the result that the starboard undercarriage collapsed and pierced the petrol tank. An outbreak of fire occurred, and the machine was completely destroyed, but none of the occupants was injured.

There was one accident to a French monoplane competing in the Light Aeroplane Competition, resulting in the death of the pilot. This accident was due to a defect in design resulting in a structural fracture in the air.

Dutch nationality.—Two accidents occurred in this country to Dutch aircraft employed on the Channel Services. In one case the pilot misjudged his approach to the aerodrome when attempting a landing after dark, and the aeroplane collided with a hedge. In the other case, the engine failed over the Channel owing to leakage of water, and consequent overheating. The pilot landed successfully on the Goodwin Sands, and the occupants were subsequently rescued.

STATISTICS OF CIVIL FLYING.

Summary.—The following tables (A to F) show the satisfactory increase in civil flying that is taking place from year to year.

During the past year the total air transport flying (Table A, page 28) amounted to 1,004,000 miles flown in 5,012 flights, as against 778,000 miles in 4,000 flights in the previous year. Passengers carried in the course of these flights numbered 15,013 (as against 11,460 in the previous year), and goods carried totalled 427 tons (as against 216 tons). These figures are all the more satisfactory in view of the fact that the Hambling Committee's report, which was published in February, 1923, recommended

the winding up of the existing air transport companies. Its publication lessened the intensive effort brought to bear on obtaining fresh traffic.

Other flying (mainly "joy riding") amounted to 120,000 miles flown and 39,227 passengers carried (as against 109,000 and 25,253 respectively).

British companies received a still larger proportion of the total passenger traffic on the cross-Channel aeroplane routes. From Table B (page 29) it will be seen that the British share during the past year was 79 per cent., as compared with 76 per cent. in the previous year. It is satisfactory to note that this increase was not the result of a proportionately greater number of flights, the British flights remaining at the previous year's figure of 58 per cent.

Table C (page 30) gives the value of the goods traffic handled by the Continental air lines. Imports and exports by air during the year reached a value of £883,233, bringing the total from August, 1919, up to £3,410,242. It should be borne in mind that the annual increase in goods traffic is less marked when the value of goods is considered than it is when the weight is taken as a basis, since the heavy traffic in newspapers is unrepresented in the former case and, further, the general freight being carried to-day is not confined to light and valuable merchandise, but includes many large consignments of a bulky nature.

An indication of the efficiency of British air transport is given in Table D (page 31), wherein it is shown that at present the average efficiency of the British services is about 91 per cent. in the summer months, 82 per cent. in the winter months and 88 per cent. for the whole year. A flight is regarded as "efficient" if completed within the time limit allowed under the subsidy scheme from the scheduled time of departure.

That the average rate of 88 per cent. is lower than the figure of 92 per cent. previously recorded for the London-Paris route alone is attributed to the greater distances flown and the shorter operating experience on the London-Cologne and London-Berlin routes.

The causes of involuntary landings on the regular services are analysed in Table E (page 32). An average of 9 per cent. of the flights commenced were interrupted through various causes. Of these interruptions, more than 60 per cent. were due to weather and about 25 per cent. to mechanical defects, interruptions caused by weather varying from about 50 per cent. in the summer months to about 70 per cent. in the winter months.

Table F (page 33) shows the accident rates for civil aviation. During the year under review one fatal accident occurred in air transport flying on regular services, and one non-fatal accident, in which no passenger was injured, occurred in "other flying for hire." The fatal accident recorded is the first which has taken place since 1920 involving loss of life to passengers travelling on the regular air routes. (Details of accidents to civil aircraft during the year under review are given on pages 23-26.)

TABLE A.
BRITISH CIVIL AVIATION.
(May, 1919, to March, 1924, inclusive.)

Period.	PART I.				PART II		
	Air Transport (Internal and Continental).				Other Flying.*		
	Machine Flights.	Machine Mileage.	Passengers carried.	Cargo carried.	Machine Flights.	Machine Mileage.	Passengers carried.
				(Tons.)			
April, 1923 - - - -	348	65,000	1,236	12·6	998	7,000	1,601
May „ - - - -	520	113,000	1,694	19·6	2,982	14,000	5,468
June „ - - - -	552	114,000	2,025	31·1	3,778	19,000	6,958
July „ - - - -	616	111,000	2,608	29·9	3,135	17,000	5,531
August „ - - - -	678	138,000	2,947	39·8	3,531	19,000	5,216
September „ - - - -	650	134,000	1,951	52·4	2,709	13,000	4,569
October „ - - - -	363	79,000	701	62·8	1,118	7,000	2,147
November „ - - - -	295	49,000	439	39·7	522	2,000	1,001
December „ - - - -	131	26,000	208	27·7	486	3,000	812
January, 1924 - - - -	177	36,000	214	31·6	855	5,000	1,287
February „ - - - -	286	59,000	408	33·3	966	6,000	1,695
March „ - - - -	396	80,000	582	46·6	1,762	8,000	2,942
Total, year ending 31st March, 1924 -	5,012	1,004,000	15,013	427·1	22,842	120,000	39,227
Total, year ending 31st March, 1923 -	4,000	778,000	11,460	216·4	13,578	109,000	25,253
31st March, 1922 - - - -	1,156	259,000	5,692	26·6	21,767	234,000	36,048
31st March, 1921 - - - -	2,641	599,000	5,754	124·5	23,513	302,000	36,694
†31st March, 1920 - - - -	754	168,000	1,155	46·0	37,067	524,000	66,785
Total : May, 1919, to March, 1924 -	13,563	2,808,000	39,074	840·6	118,767	1,289,000	204,007

* In Part II. of this table the figures subsequent to March, 1922, refer to flights for hire or reward other than air transport flights; and thus consist almost entirely of joy riding. The figures for the previous three independent periods include all flying other than regular air transport. Based on returns for 1922, about 91 per cent. of the flying shown in Part II. previous to April, 1922, would have been flying for hire or reward.

† Air Transport (Part I.) commenced in August, 1919, and Other Flying (Part II.) in May, 1919.

TABLE B.

AIRCRAFT FLIGHTS AND PASSENGERS CARRIED BETWEEN GREAT BRITAIN AND THE CONTINENT (EXCLUDING CHANNEL ISLANDS).
(August, 1919, to March, 1924, inclusive.)

Period.	Nationality of Aircraft.														Percentage of British to Total.	
	British.		French.		Dutch.		Belgian.		Others.		Total.					
	Flights.	Pas- sengers carried.	Flights.	Pas- sengers carried.	Flights.	Pas- sengers carried.	Flights.	Pas- sengers carried.	Flights.	Pas- sengers carried.	Flights.	Pas- sengers carried.	Flights.	Pas- sengers.		
															Flights.	Pas- sengers.
														%	%	
April, 1923 - - -	176	1,059	128	361	53	94	2	1	—	—	359	1,515	49	70		
May „ - - -	303	1,419	111	203	52	90	—	—	1	2	467	1,714	65	83		
June „ - - -	303	1,397	94	141	55	90	—	—	6	12	458	1,640	66	85		
July „ - - -	325	2,022	107	243	56	128	108	2	1	2	597	2,397	55	84		
August „ - - -	384	2,404	135	413	68	174	106	1	1	3	694	2,995	55	80		
September „ - - -	311	1,350	109	238	73	127	81	3	—	—	574	1,718	54	79		
October „ - - -	200	580	94	108	39	73	47	3	—	—	380	764	53	76		
November „ - - -	149	300	34	46	25	40	28	2	—	—	236	388	63	77		
December „ - - -	97	164	23	26	24	21	18	—	—	—	162	211	60	78		
January, 1924 - - -	108	169	37	52	27	28	—	—	—	—	172	249	63	68		
February „ - - -	167	296	47	71	39	50	—	—	—	—	253	417	66	71		
March „ - - -	191	488	74	205	48	76	—	—	—	—	313	769	61	63		
Total, year ending 31st March, 1924 - - -	2,714	11,648	993	2,107	559	991	390	12	9	19	4,665	14,777	58	79		
Total, year ending—																
31st March, 1923 - - -	2,965	10,066	1,486	2,423	681	679	2	1	3	3	5,137	13,172	58	76		
31st March, 1922 - - -	1,156	5,692	1,575	4,258	368	483	342	597	53	12	3,494	11,042	33	51		
31st March, 1921 - - -	2,641	5,754	786	837	3	—	176	128	4	1	3,610	6,720	73	86		
31st March, 1920 (7 months)	754	1,155	133	97	—	—	7	3	2	—	896	1,255	84	92		
Total: August, 1919, to March, 1924 - - -	10,230	34,315	4,973	9,722	1,611	2,153	917	741	71	35	17,802	46,966	57	73		

TABLE C.

VALUE OF GOODS (a) IMPORTED INTO THE UNITED KINGDOM BY AIRCRAFT; (b) EXPORTED AND RE-EXPORTED FROM THE UNITED KINGDOM BY AIRCRAFT.

(August, 1919, to March, 1924, inclusive.)

Period.	Imports from					Exports and Re-exports to				
	Belgium	France.	Nether-lands.	Other Countries.	Total.	Belgium.	France.	Nether-lands.	Other Countries.	Total.
April, 1923 -	£ 14	£ 36,375	£ 2,932	£ 2,455	£ 41,776	£ 291	£ 9,777	£ 1,878	£ 2,154	£ 14,100
May " -	9	52,161	2,783	363	55,346	683	21,417	2,267	1,590	25,957
June " -	5	42,477	4,312	320	47,114	306	17,371	4,946	4,704	27,327
July " -	105	41,220	1,531	4,561	47,417	407	13,521	2,072	1,056	17,056
August " -	133	39,684	4,063	10,722	54,602	759	14,144	1,331	3,470	19,704
September " -	640	38,366	1,770	7,970	48,746	472	4,094	1,152	4,007	9,725
October " -	993	54,918	3,271	11,991	71,173	223	17,782	2,968	5,689	26,662
November " -	645	46,260	2,387	15,220	64,512	246	13,639	3,964	9,713	27,562
December " -	355	34,704	4,464	7,025	46,548	150	5,055	2,368	3,676	11,249
January, 1924 -	10	24,268	1,760	6,128	32,166	1,365	3,494	1,798	6,850	13,507
February " -	—	32,365	2,676	5,569	40,610	—	54,860	1,615	9,323	65,798
March " -	—	46,580	2,276	5,704	54,560	68	7,665	2,012	10,271	20,016
Total, year ending 31st March, 1924 -	2,909	489,378	34,225	78,058	604,570	4,970	182,819	28,371	62,503	278,663
Total, year ending—										
31st March, 1923 -	3,651	445,488	45,106	3,877	498,122	7,837	225,144	31,373	1,318	265,672
31st March, 1922 -	4,583	325,417	8,471	560	339,031	3,535	178,759	19,741	948	202,983
31st March, 1921 -	4,453	665,099	2,178	10,579	682,309	26,570	260,954	44,210	4,297	336,031
31st March, 1920 (seven months) -	391	135,248	471	6	136,116	9,583	57,161	—	1	66,745
Total: August, 1919, to March, 1924 -	15,987	2,060,630	90,451	93,080	2,260,148	52,495	£04,837	123,695	69,067	1,150,094

TABLE D.
EFFICIENCY OF BRITISH AIR TRANSPORT SERVICES.
(October, 1922, to March, 1924. *)

Period	Flights commenced on Scheduled Services.				Percentage of Total Flights commenced which were completed within Subsidy Time.†
	Completed to Terminal Aerodrome		Not completed same Day.	Total commenced.	
	Within Subsidy Time.†	Same Day, but in more than Subsidy Time.†			
April, 1923 -	199	2	6	207	96
May, " -	301	—	20	321	94
June, " -	312	8	14	334	93
July, " -	299	24	17	340	88
August, " -	341	14	20	375	91
September, " -	273	23	16	312	88
October, " -	160	17	21	198	81
November, " -	147	12	21	180	81
December, " -	76	1	21	98	78
January, 1924 -	97	8	17	122	80
February, " -	184	12	19	215	86
March, " -	238	28	17	283	84
Total : April, 1923 to March, 1924	2,627	149	209	2,985	88
6 months—					
October, 1922, to March, 1923 -	672	30	106	808	83
April, 1923, to September, 1923 -	1,725	71	93	1,889	91
October, 1923, to March, 1924 -	902	78	116	1,096	82

* Statistics are not available prior to October, 1922.

† "Within subsidy time" = within subsidy time from scheduled time of departure.

TABLE E.
CAUSES OF INVOLUNTARY LANDINGS IN RESPECT OF FLIGHTS BY SUBSIDISED FIRMS.
(July, 1922, to March, 1924, inclusive.)

Period.	Total flights commenced.	Cause of landing.			Percentage of total landings.			Percentage of total flights commenced interrupted.
		Weather.	Engine or installation failure.	Other reasons.	Weather.	Engine or installation failure.	Other reasons.	
*July to September, 1922 - October, 1922, to March, 1923 -	1,096 994	41 99	25 22	5 12	71 133	58 74	35 17	7 13
Total (9 months): July, 1922, to March, 1923.	2,090	140	47	17	204	69	23	10
April, 1923, to September, 1923 - October, 1923, to March, 1924 -	2,589 1,444	65 148	52 39	23 24	140 211	46 70	38 19	6 15
Total (12 months): April, 1923, to March, 1924.	4,033	213	91	47	351	61	26	9
Total : July, 1922, to March, 1924 -	6,123	353	138	64	555	64	25	9

* Particulars are not available before 1st July, 1922.

Landings for petrol or oil have not been included as in nearly every case such landing was pre-arranged.

TABLE F.
ACCIDENTS: CIVIL AVIATION.
(May, 1919, to March, 1924, inclusive.)

	May, 1919, to March, 1920.		April, 1920, to March, 1921.		April, 1921, to March, 1922.		April, 1922, to March, 1923.		April, 1923, to March, 1924.	
	Air Transport.	Other Flying.	Air Transport.	Other Flying.	Air Transport.	Other Flying.	Air Transport.	Other Flying.	Air Transport.	Other Flying.
Passengers killed - - - -	1	—	2	7	No Accidents	1	—	3	—	—
Passengers injured - - - -	2	9	2	1	"	2	1	—	—	—
Passenger flights per passenger killed -	1,155	—	2,877	5,242	"	37,408	—	5,004	—	—
Passenger flights per passenger injured -	580	7,420	2,877	36,694	"	18,704	11,460	—	—	—
Crew killed - - - -	2	2	2	3	"	2	2	2	—	—
Crew injured - - - -	1	9	—	6	"	4	1	3	—	1
No. of accidents involving casualties:—										
Fatal - - - -	2	2	1	3	"	2	1	1	—	—
Non-fatal, but resulting in injury to occupants - - - -	—	11	1	6	"	4	1	2	—	1
Approximate machine miles per accident resulting in death or injury to occupants - - -	84,000	40,000	299,000	34,000	"	39,000	389,000	335,000	120,000	—

N.B.—The numbers of crew carried are not available.

For the period May, 1919, to March, 1922, other flying includes all flying other than air transport or competitive flying.
For the period April, 1922, to March, 1924, other flying is flying for hire or reward other than air transport or competitive flying.
For details of accidents during 12 months April, 1923, to March, 1924, *vide* pages 23–26.

THE DOMINIONS, INDIA AND THE COLONIES.

AUSTRALIA.—The following notes are taken from a report by the Controller of Civil Aviation, Australia, dated 1st March, 1924 :—

Geraldton—Derby Air Line.—The contract with Western Australian Airways, Ltd., has been again renewed (as from 5th December, 1923). The new contract is for three years, and contains provision for the following extensions of the original service :—

- (a) South—from Geraldton to Perth (250 miles).
- (b) North-East—from Derby to Wyndham (600 miles).

The extended service from Perth to Derby was inaugurated on 17th January, 1924, and has been maintained to schedule since that date.

The Company's machines now fly 2,684 miles each week, leaving Perth on Thursdays and returning on Tuesdays.

The subsidy payment for the extended service is at the rate of 30,000*l.* annually, but the contract provides for a possible reduction of this amount in the second and third years.

Arrangements are in hand for the preparation of the route between Derby and Wyndham, with a view to extending the service to Wyndham as early as possible in the next financial year.

With the exception of a serious accident at its inception, this service has been carried on successfully, and the facilities it has provided have been readily availed of by the residents. The number of letters carried during the first month the service was in operation was 577; this has now increased to about 15,000 per month.

Charleville—Cloncurry Air Line.—This service is operated by the Queensland and Northern Territory Aerial Services, Ltd. The original contract provided for a weekly (return) service for 12 months from 2nd November, 1922, with a subsidy of 12,000*l.* The agreement has now been renewed for a further 12 months from 2nd November, 1923, at the same subsidy rate.

The service has been maintained successfully, and is evidently much appreciated by those residents of Western Queensland who had hitherto to rely on horse or motor conveyance for their transport between the above-named rail heads.

Adelaide—Sydney and Sydney—Brisbane Air Lines.—Owing to various causes delays have taken place in the commencement of the services, but it is hoped that the aeroplanes ordered by the contractors (the Larkin Aircraft Supply Company, Ltd.) will soon arrive from England, and that very shortly thereafter a through service—weekly in each direction—will be in operation between Adelaide and Brisbane, *via* Mildura, Hay, Narrandera, Cootamundra, Sydney, Newcastle, Grafton and Ballina.

STATISTICS.

Period.	Number of Flights.*	Miles Flown.*	Hours Flown.*	Passengers carried over single stages.†	Letters Carried.	Goods Carried.	Remarks.
<i>Charleville-Cloncurry Air Line—</i>			Hrs. Min.			lbs.	
2/11/22 to 1/11/23 (1 year)	652	61,075	839 10	341	12,985	3,684 $\frac{3}{4}$	* Includes ferrying flights over route.
November, 1923 - -	55	5,193	63 40	55	1,051	555	
December, 1923 - -	55	5,193	64 30	73	1,041	283 $\frac{1}{2}$	
Total: 2/11/22 to 31/1/24	762	71,461	967 20	469	‡15,077	4,523 $\frac{1}{4}$	† Includes non-paying pas- sengers, such as mechanics, spare pilots, &c.
<i>Perth-Derby Air Line—</i>							
5/12/21 to 4/12/23 (2 years)-	1,275	226,497	2,871	845	188,344	7,852	‡ From 2/11/22 to 31/12/23 only.
December, 1923 - -	54	9,085	116	49	15,335	422	
Total: 5/12/21 to 31/12/23	1,329	235,582	2,987	894	203,679§	8,274	§ From 5/12/21 to 31/12/23 only.
GRAND TOTAL - -	2,091	307,043	3,954 20	1,363	218,756	12,797 $\frac{1}{4}$	

In the meantime it is probable that the contractors will be permitted to maintain a temporary service (for mails only) between *Sydney and Adelaide* with their reserve machines.

Future Services.—Should the vote in aid of Civil Aviation be increased next year, it will be possible to give careful consideration to four new proposals which have been submitted recently, with a view to recommending at least one service additional to the three already approved.

Briefly, these proposals are as follows :—

(1) Twin-engined flying boat service between Townsville and Rabaul.

(2) Aeroplane service between Brisbane and Charleville, linking Brisbane with the Charleville-Cloncurry service.

(3) Flying boat service between Adelaide and Port Lincoln (Eyre's Peninsula).

(4) Aeroplane service between Oodnadatta and Alice Springs, South Australia.

Training Activities.—Four civilian cadets have graduated for their pilot's "wings" as the result of their training at No. 1 Station, R.A.A.F. (1923 course); the results obtained by them in the various subjects in which they were instructed have been communicated to the operating companies with a view to their employment as pilots when vacancies occur. Three additional civilian cadet-pupils commenced their training on 29th January, 1924 (1924 course).

These cadets are nominated in the first instance by the Controller of Civil Aviation, and receive pay whilst undergoing training for a period of about 12 months.

Qualified pilots who are employed or about to be employed in commercial aviation enterprises are accepted on the recommendation of the Controller of Civil Aviation for short refresher courses of flying instruction at the Flying Training School, Point Cook. No charge is made for this refresher instruction.

CANADA.—The employment of the Royal Canadian Air Force upon forest fire patrol duties, aerial survey and transport in inaccessible districts, on behalf of civil branches of the Government, has continued and is increasing in scope.

The Government of Ontario has, after experiencing the advantage of air patrol, decided upon the establishment of a large organisation for combating forest fires by means of aircraft over the entire forest area of Northern Ontario, and for this purpose has purchased a fleet of thirteen flying boats. Apart from fire patrols, the aircraft will be used to make a general preliminary survey of the forest wealth available. It is expected that in addition to giving a patrol service and protection to several times the area previously patrolled the Province will save at least \$250,000 per year from the use of aircraft.

Up to the present the aircraft used in Canada for forest fire and photographic duties have not been of a type most suitable

to meet the conditions of the services to be performed, and development of new types specially designed for work under these conditions is in hand.

The possibilities of using aircraft to supplement railway services in remote districts have been recognised by the Canadian Pacific Railway, which, in conjunction with the Laurentide Air Service, recently established an air connection between incoming and outgoing trains at Angliers and the inaccessible mining area at Rouyn (Quebec Gold Fields). This is believed to be the first example anywhere in the world of the employment of aircraft in co-operation with a railway system, and it opens in Canada prospects of a great extension of the already large field of utility for aircraft.

In order that the work of the Royal Canadian Air Force may be continued throughout the year, in winter as well as in summer, experiments are proceeding with a view to overcoming the difficulties of winter flying, chief amongst which are the starting and care of engines in very low temperatures and the landing of aircraft on soft snow. It has been proved that the extreme cold causes no serious discomfort to a well-protected pilot.

SOUTH AFRICA.—An Air Navigation Act to enable effect to be given to the International Air Convention was gazetted on 23rd May, 1923, and became operative as from 22nd February, 1924.

NEW ZEALAND.—The past year has been one of difficulty for civil aviation and the only civil flying is done by the New Zealand Flying School, at Auckland, and two pilots who conduct passenger flights.

The Government has purchased for defence purposes the aerodrome at Sockburn, formerly the property of the Canterbury Aviation Company.

INDIA.—The financial state of the country continues to react against the development of civil aviation.

In Burma, a photographic aerial survey has been carried out of the Irrawaddy Delta, under the direction of Mr. Ronald Kemp, formerly Chief Inspector of Aircraft to the Government of India. Practically the whole of the work was carried out by one aircraft, which flew a total of about 10,000 miles and exposed 3,000 photographic plates. In all, 1,350 square miles were covered by the aerial survey and the field work was completed within three months. A ground survey would have been almost an impossibility owing to the swampy and dense nature of the country, and had it been undertaken with the same number of expert personnel it might have occupied a greater number of years than the air survey occupied months.

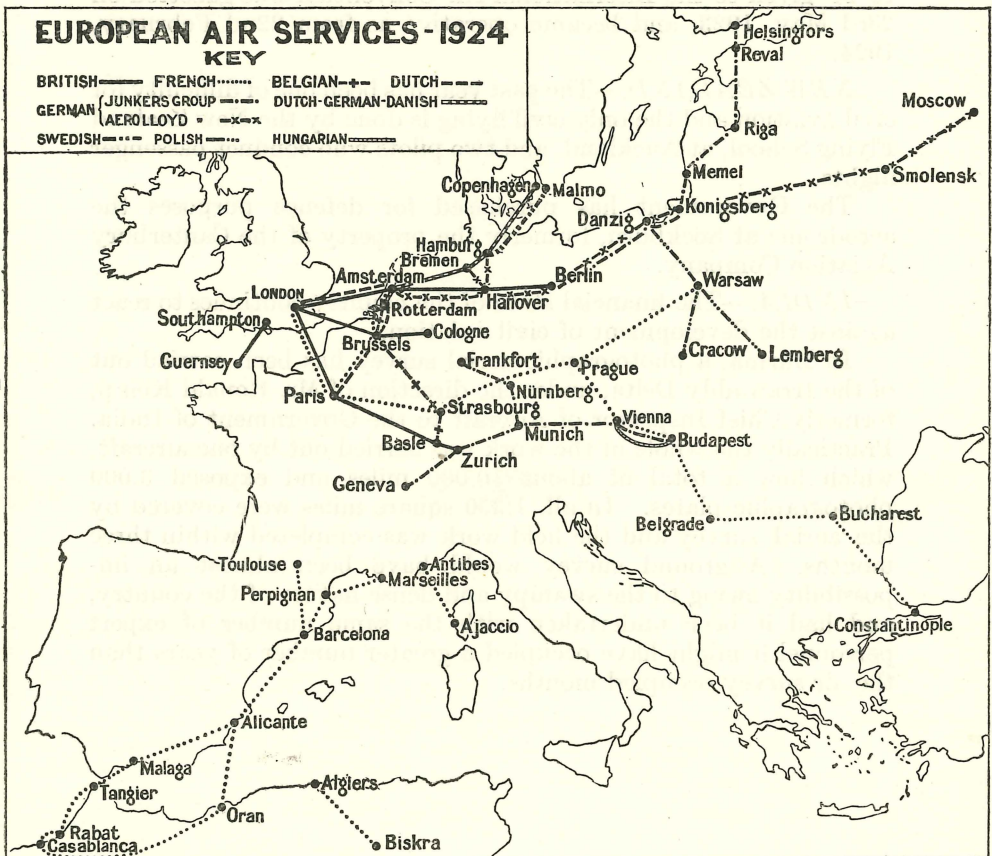
PART II. FOREIGN COUNTRIES.

GENERAL REMARKS.

The need of close international co-operation in air transport, which was touched on at this point in last year's report, has already caused a considerable advance in the direction of international uniformity in organisation and also, to a certain extent, in equipment.

Apart from the continuous efforts of the International Commission for Air Navigation to improve upon and standardise the Governmental organisation for air transport, the past year has seen the setting up of combinations of air transport companies for the purpose of operating joint services with a uniform type of aircraft and a uniform traffic and operational system.

Thus, the Danish, Netherlands and German companies interested in the route between Rotterdam, Hamburg and Copenhagen, have organised the service on a uniform basis, and in Germany the Junkers Company has brought together into two unions the various companies using Junkers machines that operate respectively the routes from Geneva to Budapest and from Königsberg to Finland.



The future of air transport may be expected to incline more and more to international management of air lines and, accordingly, to the formation of stronger bonds in international relations.

A map of the European air lines operating, or intended to be operated, in 1924 is given on page 38.

EUROPE.

AUSTRIA.

Certain aeronautical installations on the aerodromes of Aspern, Graz, Innsbrück and Klagenfurt were ceded to Austria by the contract of 26th July, 1922, on condition that they and the four aerodromes were maintained in good order, and were always available for Allied civil aircraft. This contract expired on the 1st January, 1924, so that these installations have now become the property of Austria.

The economic situation still adversely affects civil aviation, but during the current year a new company, the "Austria Flugverkehr, A.G." has been founded. The concern is a purely Austrian enterprise and the capital of one milliard crowns has been raised without foreign assistance. The company is receiving the co-operation of the Austrian Ministry of Transport, and intends to develop national air services. It is expected that it will first concentrate on a service over the Munich-Vienna-Budapest route.

This route is already being operated by the "Oesterreichische Luftverkehrs, A.G." as a member of the Trans-Europa Union (see under Germany).

BELGIUM.

The new national air transport company referred to in the preceding report—the Société Anonyme Belge d'Exploitation de la Navigation Aérienne (SABENA)—has now been founded and the law authorising the Government to participate in the formation of the company was signed by the King on 26th April, 1923.

The company is established for a period of thirty years from this date, with a share capital of 6,000,000 francs, represented by 12,000 preference shares of 500 francs each. In addition, 24,000 "dividend bearing" shares without designation of value are constituted.

The 12,000 preference shares (on which 40 per cent. has been called up and paid) have been taken up by the three founders as follows :—

The Belgian State, represented by the		
Minister of National Defence	- - -	5,800 shares
The Belgian Congo, represented by the		
Minister of the Colonies	- - -	200 "
The Société Nationale pour l'Etude des		
Transports Aériens (S.N.E.T.A.)	- - -	6,000 "

Of the 24,000 dividend-bearing shares, 12,000 have been allotted to these founders in the same proportion as the preference share holdings, and the remaining 12,000 have been allotted in consideration for various past and future services as follows :—

The Belgian State	-	-	-	-	9,000 shares
The Belgian Congo	-	-	-	-	2,000 „
The S.N.E.T.A.	-	-	-	-	1,000 „

The liability of the Government for the first five years was fixed at the figures given in the last report. When this period has expired, the liability will be fixed for subsequent quinquennial periods during the first six months of each period.

A modification to the original proposals has been introduced whereby the company, instead of being granted a monopoly of air transport in Belgium, receives for the period of its duration (*i.e.*, 30 years) preferential treatment, *ceteris paribus*, as regards the exclusive right to the transport by air in Belgium of mails and postal packets, both for home and abroad.

A monopoly for air transport in the Congo has, however, been conceded. The company undertakes to grant priority of transport for the Belgian Government and the Government of the Belgian Congo up to 45,500 ton/kilometres for each of the years 1923 to 1927 inclusive, on the basis of a minimum number of 17 flights in each direction. The company will be subsidised for its operations in the Congo in such a way that for each of the years mentioned above, its receipts on account of the transport of the tonnage mentioned shall attain 1,500,000 francs. Should any of the flights not be carried out this sum will be proportionately reduced.

During the year under review the only service actually operated by the S.A.B.E.N.A. was a goods and mail service between Brussels, Ostend and Lympe.

The company inaugurated a Rotterdam-Brussels-Luxembourg-Strasbourg-Basle service on the 1st April, 1924.

At the commencement this service is being carried out with small machines for transporting chiefly mails and goods. Later, a regular passenger service will be established, when larger machines, probably of British design, will be used.

Preparations are also well in hand for the establishment of a service in the Congo from Kinshasa *via* Ilebo to Bukama (Katanga). The Kinshasa-Ilebo section will occupy one day and the Ilebo-Bukama section the following day. Large three-engined aircraft of British design are to be employed on this service.

CZECHOSLOVAKIA.

A sum of 17,950,080 crowns has been voted for civil aviation in 1924, of which sum 11,000,000 crowns is for air transport subsidies and 6,000,000 crowns is for subsidies for other purposes, including inventions. Preparations are being made for the

inauguration of an air service between Prague and Bratislava, with a possible extension to Kosice, and plans are being studied for connecting Czechoslovakia by air with the Adriatic. (*Note.*—A proposal to extend the British London-Cologne Air Line to Prague is mentioned on page 7.)

DENMARK.

An air line between Copenhagen and Hamburg was maintained from 17th April to 15th October, 1923, by the Danske Luftfartselskab. 92·3 per cent. of the scheduled flights were carried out, 414 passengers were carried, and 90,000 km. (56,250 miles) were flown.

In 1924, a through service between Copenhagen and Rotterdam is to be established as the result of a working arrangement which has been effected between the Danske Luftfartselskab, the Deutscher Aero-Lloyd (Germany) and the Koninklijke Luchtvaart Maatschappij—K.L.M.—(Netherlands).

This service is designed to speed up communications between Scandinavia and Western Europe, and will connect at Rotterdam with the day air services and night ordinary services to Paris, London, &c.

It is understood that the Danish share in this undertaking is in practice in the nature of a direct State undertaking, the Danish company acting only as the administrative organisation on behalf of the Government. Thus, should there be any profits from the route beyond the State subsidy granted, these profits will accrue to the State and not to the company.

FRANCE.

The financial provision for civil aviation and allied services reached its maximum in 1921 and 1922. A large increase was asked for in 1923, but owing to the need for economy the amount actually voted showed a reduction of nearly 9 million francs over the 1922 vote. It is expected that for 1924 the vote will be identical with that for 1923.

The actual figures for the last five years are as follows :—

1919	-	-	-	-	-	37,000,000 francs.
1920	-	-	-	-	-	128,794,770 „
1921	-	-	-	-	-	147,401,512 „
1922	-	-	-	-	-	147,210,970 „
1923	-	-	-	-	-	138,463,350 „

An analysis of the vote for 1923 shows a reduction of 22½ million francs in the provision for the Service de la Navigation Aérienne (S.N. Aé.) as compared with the previous year, this being partially counteracted by an increase of 11½ millions in the provision for the Service Technique (S.T. Aé.). More importance

is thus being attached to research and technical development, as was foreshadowed in the last report. The actual sum allocated to the S.T. Aé. was 56,408,000 francs, and to the S.N. Aé. 21,722,000 francs.

The amounts voted for air transport subsidies for the corresponding five years were :—

1919	-	-	-	-	-	} 10,437,253 francs.
1920	-	-	-	-	-	
1921	-	-	-	-	-	31,700,000 „
1922	-	-	-	-	-	45,382,000 „
1923	-	-	-	-	-	46,922,000 „

A revised system of air transport subsidies came into force on 1st January, 1924, consisting of the payment of one subsidy only, which is proportional to tonnage carried and distance flown. The speed factor is no longer taken into consideration. In the event of a deficit in a company's accounts such deficit will be met by the Government provided that it does not exceed 50 per cent. of the subsidy paid. Details are not yet known of the allocation of the vote for subsidies in 1924, but it is believed that the subsidies for the purchase of sports and propaganda aircraft, reintroduced in 1923, will again be suppressed.

The French plans for the development of commercial services have not materialised to the extent that was anticipated, owing to political difficulties.

For example, the organisation of the Paris-Constantinople line has been retarded, owing to the difficulties met by the Compagnie Franco-Roumaine de Navigation Aérienne in arriving at an agreement with the Turkish Government. The regular service has, therefore, terminated at Bucharest (Roumania). Negotiations are, however, still proceeding, and it is hoped ultimately to run a through service to Constantinople and possibly to extend it to Angora. Meanwhile, night flying experiments have been carried out on the Belgrade-Bucharest section with a view to establishing in the future a combined rail and air connection between Paris and Constantinople in under 36 hours, the final stages between Belgrade, Bucharest and Constantinople being flown at night.

The same Company has also experienced difficulties in operating the Paris-Strasbourg-Warsaw service, a number of aircraft having been confiscated by the German Government following upon forced landings in Germany. This service will, however, continue to be maintained.

With regard to the Colonial services, the first section of the Marseilles-Algiers line (viz., Marseilles-Perpignan-Barcelona) is now in operation and connects at Perpignan with the service to Casablanca. The scheme for extending the Toulouse-Casablanca line to Dakar (Senegal) is approaching the stage of experimental operation. A survey by air of the route has been carried out, and the necessary landing grounds have been provided.

In order to co-ordinate the development of air transport at home and abroad the Junkerswerke, A.G., with the assistance of the Deutscher Aero Lloyd, A.G., has entered into association with other German and foreign concerns and formed the "Nord-Europa" and "Trans-Europa" Unions, which are understood to include the following companies :—

Nord-Europa Union (formerly "Ost-Europa Union").

Junkers-Werke, A. G.
 Deutscher Aero Lloyd, A.G.
 Dantzigar Luftpost G.m.b.H.
 Lettish Air Transport Co. "Aero-Lat," Riga.
 Esthonian Air Transport Co. "Aeronaut," Reval.
 Finnish Air Transport Co. "Aero, O.Y.," Helsingfors.

Trans-Europa Union.

Junkers-Werke, A.G.
 Deutscher Aero Lloyd, A.G.
 Rumpler Luftverkehr, A.G., Munich.
 Bayerischer Luftloyd, G.m.b.H.
 Ad-Astra Aero, A.G., Zurich.
 Osterreichische Luftverkehrs, A.G., Vienna.
 Ungarische Aero-Express, R.T., Budapest.

Both of these Unions base their organisation upon the use of one type of machine—the Junkers five passenger monoplane. The Deutscher Aero Lloyd, whilst a member of both Unions, retains an independent organisation and operates services distinct from those of the Unions.

Whereas in 1922, Germany had in operation 15 short air routes, she now has but six main lines, all radiating abroad, as follows :—

Route.	Combine or Company.
Berlin – Hamburg – Amsterdam – London.	Deutscher Aero Lloyd A.G. (in conjunction with Imperial Airways, Ltd.)
Berlin–Dantzig–Konigsberg	- Junkers-Werke A.G. and Deutscher Aero Lloyd A.G.
Konigsberg – Memel – Riga – Reval –Helsingfors.	Nord-Europa Union.
Geneva–Munich	} Trans-Europa Union.
Munich–Frankfort	
Munich–Vienna–Budapest	
Berlin–Konigsberg–Moscow	
	Deutsche - Russische Luftverkehrs G.m.b.H. (jointly owned by the Russian Government and the Deutscher Aero Lloyd A.G.).

The following statistics are given of air transport carried out by German aircraft in 1923 :—

	Flights completed.	Distance covered.	*Passengers carried (by stages).	Freight and mails carried.	†Regularity.
<i>Junkers Group</i>	986	Miles. 322,850	5,368	Tons. 33	% 90
<i>Routes :—</i> Konigsberg—Memel—Riga. Berlin—Dantzig—Konigsberg. Berlin—Leipzig—Munich . Munich—Zurich—Geneva. Munich—Vienna.					
<i>Deutsche-Aero-Lloyd Group—</i> <i>Routes :—</i> Berlin—Dantzig—Konigsberg. ‡Berlin—Amsterdam—London	392	125,850	3,139	13	79
Total	1,378	448,700	8,507	46	—

* Number of passengers carried one stage.

† Percentage completed of flights commenced.

‡ Including traffic carried out by British aircraft.

With regard to the Konigsberg—Moscow line (operated by machines bearing Russian nationality) the following figures have been issued for the years 1922 and 1923 :—

	1922.	1923.	Increase per cent.
No. of journeys scheduled	113	155	37
Percentage of journeys completed . .	96·5	99	2·5
No. of passengers carried	286	352	23
Weight of goods carried in kgms. . .	18,298	22,468	23
Weight of mails carried in kgms. . .	1,047	1,684	61
Total weight carried in kgms. . . .	42,225	50,550	19·5
Percentage of total effective load utilised	91	93·2	2·2
No. of damages to machines	9	1	—
No. of accidents to passengers . . .	Nil.	Nil.	—

HOLLAND.

It is reported that a Government subsidy of 1,400,000 florins has been granted to the Koninklijke Luchtvaart Maatschappij

voor Nederland En Kolonien (K.L.M.), spread over a period of four years, thus :—

1923	-	-	-	-	-	-	-	400,000 florins
1924	-	-	-	-	-	-	-	400,000 „
1925	-	-	-	-	-	-	-	300,000 „
1926	-	-	-	-	-	-	-	300,000 „

This company now operates the following services :—

Amsterdam-Rotterdam.

Amsterdam-Rotterdam-London (in conjunction with Imperial Airways, Ltd.).

Amsterdam-Rotterdam-Paris.

An Amsterdam-Rotterdam-Brussels-Paris line was originally run by this company in conjunction with the French Air Union, but on the 4th June, 1923, a direct service Amsterdam-Rotterdam-Paris was commenced and an independent service was at the same time run to Brussels, connecting as before with the Air Union's machines to Paris. Ultimately, however, the Brussels services were withdrawn, leaving an Amsterdam-Rotterdam and an Amsterdam-Rotterdam-Paris service.

The Paris service has developed satisfactorily and it is proposed to extend the line to Marseilles, as already many passengers to and from Marseilles avail themselves of the Paris-Amsterdam section.

Preparations are in hand for the organisation of a flight and eventually a regular air service between the Netherlands and the Dutch East Indies. An organising committee consisting of Sir Henry Deterding, Mr. H. Cremer, Dr. C. J. K. van Halst and others has been in existence some time for this purpose. It is expected that the preliminary flight will be made in October, 1924, by way of Hungary, Turkey, Iraq, the Persian Gulf, India and Siam.

HUNGARY.

In anticipation of the withdrawal of the restrictions (which took effect on the 17th November, 1923) imposed by the Trianon Peace Treaty, two important commercial enterprises were established in 1922, viz., the Hungarian Air Traffic Company and the Hungarian Aero-Express Company.

The Hungarian Air Traffic Company operates a service between Vienna and Budapest, using six Fokker machines. Other services on this route are operated by the Hungarian Aero Express Company, whose service, carried out by seaplanes along the Danube, is part of the system of the Trans-Europa Union (*see* under Germany), and by the Compagnie Franco-Roumaine de Navigation Aérienne, as a stage of that company's Paris-Bucharest(-Constantinople) service.

The results obtained by the Hungarian companies in 1923 were as follows :—

	Flights.	Passengers carried.	Goods carried.
Hungarian Air Traffic Company (30.7.23–30.10.23) - - -	151	355	8,467 lbs.
Hungarian Aero-Express Company (15.7.23–30.9.23) - - -	62	187	2,204 „

In addition, a considerable number of pleasure flights over Budapest and Lake Balaton and occasional flights to various towns were carried out.

ITALY.

The Italian Government is making headway in the re-organisation of Italian aviation. Italy's ratification of the International Air Convention was deposited on 13th March, 1923, and on 20th August, 1923, an Air Navigation law was passed bringing into force the provisions of the Convention.

A large syndicate, the National Aeronautical Corporation, has been formed, which unites all the aeronautical organisations of the kingdom and is actively supported by the Government. The aims of the corporation are as follows :—

- (a) To co-ordinate and supervise all aeronautical activities.
- (b) To organise flying personnel in accordance with Fascist principles.
- (c) To ensure a living wage by contracts fixing the minimum rates and the conditions of labour.
- (d) To promote technical and industrial development.
- (e) To carry on an active propaganda campaign.
- (f) To co-operate with the Commissariat for Aeronautics by all the means in its power.
- (g) To operate air services, both internal and international.

Under the jurisdiction of this corporation, a number of aviation centres will be instituted under the control of district delegates for the training of ex-service pilots. Forty pilots will constitute a centre.

The meteorological service has been reorganised and an efficient system of communication established.

An Aerological Bulletin was inaugurated on 1st July, 1923. This bulletin is issued every five hours and gives the weather conditions in Italy 50 minutes previously. By October, 1923, further improvements had been effected and observations applying to the whole of Italy may now be read at 26 distributing points.

An Italian Air Transport Company, the "Aero-Express," was formed early in 1923 for the purpose of organising air lines throughout the country, and has drawn up plans for an air line

from Brindisi to Athens and Constantinople. It is understood that the Government is prepared to grant a subsidy for this line.

The encouragement of aviation by means of competitions and exhibitions is also being energetically pursued. Italian constructors of aircraft and aircraft engines are given every support in competing in international events and the organisation of national competitions is assisted by the State so far as possible.

At a meeting, held early in 1924, of representatives of the big insurance companies it was decided to form an aeronautical insurance company with headquarters in Rome. The objects of this company, the "Consorzio Italiano di Assicurazioni Aeronautiche," are to co-ordinate the development of aeronautical insurance with a view to supporting the constructional work of the Italian aeronautical industry. It is understood that the combine has entered into relations with a British concern in order to benefit by the collaboration of the British insurance market.

ROUMANIA.

Roumanian efforts to develop civil aviation are being concentrated for the time being on the inauguration by the State of a national air service between Bucharest, Galatz and Kishineff during the summer of 1924. It is understood that at a later date, when the service is firmly established, the line will be turned over to commercial operation.

The terminal aerodrome of Bucharest, at Baneasu, has been equipped with new hangars and brought up to date as an international air port.

SOVIET RUSSIA.

The past year has seen the commencement in Russia of a great effort to establish air transport services on a large scale. The enormous distances to be traversed, together with the absence or failure of railways, give a natural impulse to civil aviation.

An intensive propaganda campaign is being carried on, and the interest aroused is crystallised into bodies known as "Joint-Stock Companies of the Volunteer Air Fleet," to whose funds the public are invited to subscribe.

Of these companies, the chief is the "Dobrolet," which commenced work on 17th March, 1923, with a capital of 500,000 gold roubles. By 1st May the capital had been increased to 1½ million gold roubles, and it was to be further increased to 2 millions. The company is organised on the lines of the Russian Volunteer Mercantile Fleet, and is understood to be receiving a subsidy from the Government until such time as it becomes self-supporting.

Aircraft and trained personnel have to be obtained from abroad, and up to the present the main source of supply has been Germany. The Junkers-Werke, A.G., of Dessau, have established an air transport branch in Russia to exploit the concession for civil aviation which was granted to them in 1922. As from

May, 1923, the Junkers concern maintained for several months an air line between Moscow and Tiflis, and the company hope to reopen this line, with extensions, if possible, to Leningrad and Persia (Teheran), during the present year. The same company have also under consideration a line between Leningrad and Stockholm.

The air line between Königsberg and Moscow, operated by the Deutsche-Russische Luftverkehrs, A.G., completed its second season of regular working (*see also* under Germany).

SPAIN.

A scheme is under consideration for combining the Naval, Military and Civil Air Departments under one authority.

The progress of civil aviation has been affected by the political changes that have taken place in the country, and the only new development to record is the placing of contracts for the training of military pilots with two civil companies.

The preliminary work for the organisation of an airship line between Spain and South America is being continued.

SWEDEN.

An air transport company has been formed by Captain Carl and Lieutenant Adrian Florman, with the title "Aerotransport, A.B.," for the operation of an air line between Malmö and North Germany, connecting with the British and Dutch lines to Amsterdam, Rotterdam, Paris, and London.

It is proposed to open the service in June, 1924. Under an agreement made by the company with the Swedish Post Office the company undertakes to carry up to 150 kgs. of mails on each flight, in return for a subsidy of 300 kroner per flight. As soon as delivery can be obtained the service will be run with British D.H. 50 machines.

(NOTE.—The participation of the British aircraft industry in an international aeronautical exhibition held at Gothenburg in July-August last is referred to on page 13.)

SWITZERLAND.

The Swiss Government is showing how keenly it appreciates the advantages of rapid mail transport by air to an inland country. It has during the past year given considerable attention to the problems affecting international air mails. In January, the Swiss Federal Air Office announced that negotiations were proceeding respecting the working of the following air mail services in 1924 :—

Geneva—Zürich—Munich(—Vienna—Budapest).

Geneva—Lyons.

Lausanne—Paris.

Zürich—Basle—Paris(—London).

Basle—Strasbourg—Luxemburg—Brussels—Rotterdam.

The Swiss Ad-Astra Company is a member of the Trans-Europa Union and operates the Geneva-Zurich-Munich route in association with that body (*see* under Germany).

The company carried 1,087 passengers and 23,190 letters in 1923 as against 594 passengers and 4,507 letters in 1922.

An innovation in 1924 is to be the opening of an "omnibus" service between Geneva and Zurich, with calls at Lausanne, Neuchatel, Berne, Lucerne and St. Gall.

AMERICA.

ARGENTINA.

The air mail service between Buenos Aires and Montevideo, organised by the River Plate Aviation Company, was opened on 2nd January, and operated daily (except Sundays) up to the end of March, under a contract with the Argentine Government whereby the company undertook to carry a load of up to 100 kgs. of mails on each flight in return for a subsidy.

The contract was renewable at quarterly intervals, and under its terms the rate of subsidy to be paid was fixed on the basis of an annual maximum of \$108,000 (Argentine) currency.

Very promising traffic results were obtained during the initial period, as is shown by the following figures (up to March 26th) :—

	January.	February.	March.
Flights projected - -	65	63	49
Flights completed - -	63	62	48
Passengers carried - -	212	213	149
Bags of mails carried - -	48	52	68

It was proved during this period, however, that the service could not be maintained on a sound basis with the rate of subsidy being granted, and in view of the considerable success obtained it was hoped that the Government would see its way to increase the rate of subsidy for the future.

A British Air Attaché was appointed to Buenos Aires in November, 1923.

COLOMBIA.

Up to June, 1923, the Sociedad Colombo-Alemana de Transportes Aereos (SCADTA), operating a sea-plane service along the Magdalena River, had, in the course of two years' regular operation, carried out 1,051 flights and transported 10,200 kgs. of mail and 2,200 passengers. More than 3,000 letters were being carried per month, and of these a considerable number were inward and outward mails.

The company has established agencies in the principal towns throughout the world where air mail stamps for the service can be purchased and letters handed in for despatch by ordinary post

to Colombo. On the arrival of the incoming mail steamers at the port of Barranquilla these letters are delivered to the company and taken by air to various points in the interior. Receipts from the sale of air mail stamps accrue to the company.

Aerial survey is included among the company's interests, and a sister concern, known as Compania Santandereana de Aviacion, has been formed to take charge of this branch.

Encouraged by its success in Colombia, the SCADTA is making efforts to extend its activities into the neighbouring republic of Venezuela.

U.S.A.

The Wadsworth Bill referred to in the last report, passed the Senate on the 8th January, 1924, and was referred to the Committee on Interstate and Foreign Commerce.

A more comprehensive Bill was, however, introduced by Mr. Winslow in the House of Representatives and by Senator Wadsworth in the Senate on the 13th December, 1923, and was similarly referred to the Interstate and Foreign Commerce Committee.

The latter Bill embodies practically the whole of the contents of the former, and provides for a Bureau of Civil Aeronautics in the Department of Commerce under the direction of a "Commissioner." Provision is also made for the licensing of personnel, the registration of aircraft, and the maintenance of log-books. The Department of Commerce is to be empowered to make rules and regulations for air navigation, to designate and approve commercial air routes and to maintain the necessary supplies, equipment, repair facilities and aerodromes for the operation of such routes. All existing laws of the United States are to be applied as far as possible to air navigation. In addition a civil aeronautic consulting board is to be set up, comprising representatives of the aircraft manufacturers, designers, engineers and operating companies to co-ordinate the work of developing the aircraft industry.

It is anticipated that this second Bill will become law in more or less its present form during the 1924 session.

The vote for the Post Office trans-Continental Air Mail Service for the year ending 30th June, 1923, was \$1,900,000, and for the year ending 30th June, 1924, \$1,500,000.

The results of this service for the last three years are as follows:—

	1921.	1922.	1923.
Miles flown	1,770,650	1,729,310	1,870,422
Number of letters, &c. carried	44,834,080	48,980,480	65,295,920

The Chicago-Cheyenne section of the air mail route has been organised for night flying and successful tests were carried out on five consecutive nights during August, 1923, as a result of which a further trial for one month is to be conducted.

The Postmaster General invited tenders for the carriage of air mails for the year ending 30th June, 1924, on the routes:—

Seattle (Washington)—Victoria (B.C.).

New Orleans (Louisiana)—Pilottown (Louisiana).

The Hubbard Air Transport Company, the previous contractors, eventually regained the contract for the first route, and Messrs. Merrill and K. Riddick of New Orleans obtained the second contract.

In addition, the contract for the air mail service

Key West (Florida)—Havana (Cuba),

with the Aeromarine Air Transport Company, was renewed.

It is proposed to open a fourth mail route between Nenana and Fairbanks (Alaska), but no contract has yet been placed.

The Aeromarine Air Transport Company also continued its Cleveland—Detroit service with success, but was obliged in August, 1923, to discontinue its New York—Atlantic City service. This company has since been dissolved and a new organisation formed, styled the Aeromarine Airways Corporation of New Jersey, which now operates the Florida—Cuba service in conjunction with the Florida Railroad and Navigation Company, and is continuing the Cleveland—Detroit route.

Aircraft have also been employed on an extensive scale for forest patrol work; for re-seeding large areas in connection with conservation or reclamation projects; for the dusting of orchards in New England to destroy the gypsy moth, and of cotton fields in the south to destroy the boll weevil; for the enforcement of the prohibition laws; and for aerial photographic and survey work, and advertising purposes.

Considerable propaganda work has been effected on behalf of civil aviation by the Army and Navy Air Services by concentrating on record breaking, participation in races, *e.g.*, the Schneider Cup, and the organisation of a Round-the-World flight (now in progress).

On the 4th September, 1923, the first rigid airship of the U.S. Navy, the Z.R.1, later renamed the "Shenandoah," was launched and is being operated mainly to determine the commercial possibilities of airships. This airship is the first of the rigid type to be inflated with helium.

Later in the year a private concern, the General Air Service Corporation, acquired the sole rights for the manufacture of Zeppelins in the U.S.A.

(Signed) W. S. BRANCKER,
Director of Civil Aviation.

11th June, 1924.